

REMARKS

Claims 1–29 are pending prior to this response. Claims 1–29 stand rejected. Claim 30 has been added. After this response, claims 1–30 are pending.

The Claims are Enabled for Use of a Non-Wetting Agent

Claims 1–25 stand rejected under 35 U.S.C. § 112, first paragraph, assertedly because the specification “does not reasonably provide enablement for the use of any type of gas or liquid. . . . The claims embrace an invention which contains any known fluid/liquid, which could/can be selected from literally thousands. . . . Further, for one skilled in the art to reproduce the present invention . . . , there would clearly be undue experimentation to do so in an attempt to figure out which liquids and gases work and which do not.”

Applicants respectfully submit that claim 1 requires that “the fluid is a non-wetting agent for the metal or carries a non-wetting agent for the metal.” Thus, the claims define the fluid that may be used with a particular metal in accordance with the claimed invention. The specification, at page 3, lines 15–23, defines a non-wetting agent. Not every fluid is a non-wetting agent for any particular metal.

Non-wetting agents are well known. Determination of whether a fluid is a non-wetting agent for a particular metal is a process that is well known in the art. A patent preferably omits what is well known in the art. MPEP § 2164.01.

Moreover, whether undue experimentation is necessary is not a single factual determination, but “[r]ather, it is a conclusion reached by weighing all the above noted factual considerations.” MPEP § 2164.01(a). “These factors include, but are not limited to:

- (A) The breadth of the claims;
- (B) The nature of the invention;
- (C) The state of the prior art;
- (D) The level of one of ordinary skill in the art;
- (E) The level of predictability in the art;
- (F) The amount of direction provided by the inventor;
- (G) The existence of working examples; and

(H) The quantity of experimentation needed to make or use the invention based on the content of the disclosure.”

MPEP § 2164.01(a). From the remarks in the Office Action, it appears that only the “quantity of experimentation” factor was considered. However, “[t]he test [of undue experimentation] is not merely quantitative, since a considerable amount of experimentation is permissible, if it is merely routine, or if the specification in question provides a reasonable amount of guidance with respect to the direction in which the experimentation should proceed.” *In re Wands*, 858 F.2d, 731, 737 (Fed. Cir. 1988); MPEP § 2164.06. In the present application, Applicants respectfully submit that any experimentation is merely routine determination of non-wetting properties. The specification provides a reasonable amount of guidance with respect to the direction that the experimentation should proceed, because the claims expressly recite a non-wetting agent.

The Office Action has failed to establish a prima facie case of non-enablement based solely on an assertion that a large quantity of experimentation would be required. Applicants respectfully submit that the Office Action apparently did not consider the limitations in the claims that define what fluids are suitable.

Thus, Applicants respectfully submit that the rejection for lack of enablement is improper, and respectfully request withdrawal of the rejection on that basis.

The Claims Provide Adequate Definiteness

Claims 1–25 stand rejected under 35 U.S.C. § 112, second paragraph, as assertedly “indefinite for failing to particularly point out and distinctly claim the subject matter which the applicant regards as the invention.”

Claims 1 and 16 are assertedly indefinite “because it is unclear what one of ordinary skill in the art would consider as a pressurized fluid.” Applicants respectfully submit that the terms “pressurized” and “fluid” are well known in the art. Moreover, the specification provides that fluids at any pressure will provide some degree of removal of the adherent molten metal. Page 6, lines 25–26. The specification further provides that the “specific pressure or velocity that is optimum for a particular application will depend on the molten metal being used, and other considerations of the particular application. Determination of effective pressures or velocities is easily accomplished by one of ordinary skill in the art for specific sets of circumstances without

undue experimentation.” Page 6, lines 25–29. Thus, claims 1 and 16 are definite because they “set out and circumscribe a particular subject matter with a reasonable degree of clarity and certainty,” and “those skilled in the art would understand what is claimed when the claim is read in light of the specification. MPEP § 2173.02.

Claim 2 is assertedly indefinite “because it is unclear at what point the non-wetting agent is retained on the surface. Further, how does one of ordinary skill in the art define ‘some.’” Applicants respectfully submit that specification sets forth that the non-wetting agent is retained on the surface after application of the non-wetting agent to the surface, for example, as described at page 2, line 29 through page 3, line 2. Applicants also substitute “a portion of” for “some.” This amendment does not narrow the claim, but is provided for clarification.

Claim 3 is assertedly indefinite “because it is unclear what one of ordinary skill in the art would consider as an ‘elevated temperature.’” Applicants have amended claim 3 and the term “elevated temperature” is no longer present. This amendment does not narrow the claim.

Claim 4 is assertedly indefinite “because it is unclear what one of ordinary skill in the art would consider as ‘near’ the melting point.” Applicants respectfully submit that one of ordinary skill in the art would understand the common word “near.” Nonetheless, claim 4 has been amended and “near” is no longer present.

Claim 4 is also assertedly indefinite “since it is not clear what is the metal and the melting point of the metal, the limitations of the temperature of the fluid at or near the melting point of the metal renders the claim indefinite.” Applicants respectfully submit that the metal is as defined in claim 1. For clarification, the modifier “molten” is provided, without narrowing the claim. The melting point temperature of a metal is a known physical property of a metal. So for a given metal, the temperature at which it melts is known; therefore, the temperature of the fluid at or near the melting point of the metal is definite. Claim 4 has been amended to specify melting temperature instead of melting point for clarity and does not narrow the claim.

Claims 10–14 are assertedly indefinite “because the non-wetting agent is a solid composition and claims 10–11 are dependent on claim 1 which recites a fluid, a fluid being a gas or liquid by definition.” Applicant respectfully submits that claim 1 recites “wherein the fluid is a non-wetting agent for the metal or carries a non-wetting agent for the metal.” The fluid may be

the non-wetting agent, or the fluid may carry the non-wetting agent. The non-wetting agent is not limited to a fluid. See, for example, specification page 7, lines 7–9, describing an embodiment of a fluid (air) carrying a solid non-wetting agent (carbon or graphite). Thus, it is respectfully submitted that claims 10 and 11 are not indefinite.

Claim 10 is assertedly indefinite “because it is unclear what one of ordinary skill in the art would consider as ‘other carbon sources.’” Applicants respectfully submit that one of ordinary skill in the art would understand the common term “carbon source.” Nonetheless, claim 10 has been amended to specify “other carbon” instead of “other carbon sources.” This amendment does not narrow the claim.

Claim 13 is assertedly indefinite “because the ‘fluid stream’ lacks positive antecedent basis.” Claim 13 has been amended to remove the term “stream.” This amendment does not narrow the claim.

Claim 14 is assertedly indefinite “because it is unclear what is meant by ‘another carbon form.’” Claim 14 has been amended to remove “another carbon form,” and the amendment does not narrow the claim.

Claim 17 is assertedly indefinite “because ‘the molten metal atoms’ and ‘the metal portion of the ceramic’ lacks positive antecedent basis.” Applicants submit that proper antecedent basis is established because molten metal inherently has atoms. Nonetheless, applicants have amended claim 17 to provide positive antecedent basis for both terms. The metal portion is clarified to include silicon, as well. Such amendments do not narrow the claims.

Claim 15 is assertedly indefinite “because it is unclear what is meant by ‘thermal management equipment.’” Applicants respectfully submit that the term recited in the claim is “thermal management material.” Thermal management material is a term readily understood by one of ordinary skill in the art and is described in the specification at page 8, lines 1 and 2.

Claim 19 is assertedly indefinite “because ‘fused silica’ lacks positive antecedent basis.” Claim 19 is amended to clarify that “fused silica” is initially introduced in claim 19.

Claims 20 and 21 are assertedly indefinite “because applicant is claiming a solid, however a fluid, by definition is a gas or liquid.” Applicant respectfully submits that claim 16, from which claims 20 and 21 depend, recites “wherein the fluid is a non-wetting agent for the

metal or carries a non-wetting agent for the metal.” The fluid may be the non-wetting agent, or the fluid may carry the non-wetting agent. The non-wetting agent is not limited to a fluid. See, for example, specification page 7, lines 7–9, describing an embodiment of a fluid (air) carrying a solid non-wetting agent (carbon or graphite). Thus, it is respectfully submitted that claims 20 and 21 are not indefinite.

Claims 1–25, as amended, “set out and circumscribe a particular subject matter with a reasonable degree of clarity and particularity.” MPEP § 2173.02. Each of the claims, as a whole, “apprises one of ordinary skill in the art of its scope, and, therefore, serves the notice function required by 35 U.S.C. § 112, second paragraph, by providing clear warning to others as to what constitutes infringement of the patent.” MPEP § 2173.02. As to each of the claims, “those skilled in the art would understand what is claimed when the claim is read in light of the specification.” MPEP § 2173.02; *Orthokinetics, Inc. v. Safety Travel Chairs, Inc.*, 806 F.2d 1565, 1576 (Fed. Cir. 1986).

Applicants respectfully submit that the claims, as amended, are not indefinite, and respectfully request withdrawal of the rejections under 35 U.S.C. § 112.

U.S. Pat. No. 5,922,144 Does Not Anticipate the Present Invention

Claims 1–5, 7–8, 15, 25, and 27 stand rejected under 35 U.S.C. § 102(e) as assertedly anticipated by U.S. Pat. No. 5,922,144 to Sykes. The Office Action asserts that the limitations of a non-wetting agent of the present invention are met by the teaching of Sykes of application of a pressurized gas at an angle of incidence of at least 45 degrees. Applicants respectfully traverse the rejection under Section 102(e) on this basis.

In short, Sykes teaches that the angle between the gases and the molten metal is at least 45 degrees. Col. 2, lines 10–15; col. 3, lines 50–65. This is the torch angle. The present invention claims a non-wetting agent defined in part as an agent applied to a surface that results in either a contact angle between the molten metal and the surface of less than about 105 degrees, or prevents adherence of a metal to the surface after the metal has solidified. This is the wetting angle. The Sykes torch angle is different from the wetting or contact angle of the present application.

A non-wetting agent is an agent “that, when applied to a surface, results in either a contact angle between a particular molten metal and the surface of less than 105°, or a layer between the molten metal and the surface that prevents adherence of the metal to the surface after the molten metal has solidified, and includes precursors to non-wetting agents.” Specification page 3, lines 15–19. The angle is a physical property of a metal with respect to a surface that results from the surface interaction between a liquid and a solid, and is not selected by the user.

The non-wetting agent is not applied at any particular angle. The non-wetting agent is applied to a surface to cause the “contact angle between a particular molten metal and the surface [to be] less than 105°,” or provides “a layer between the molten metal and the surface that prevents adherence of the metal to the surface after the molten metal has solidified.” Specification page 3, lines 15–19. Whether an agent is a non-wetting agent is dependent on the specific molten metal and the composition of particular surface to which the agent is applied. What is a non-wetting agent with respect to one metal may not be a non-wetting agent with respect to another metal. The claims of the present application recite use of a non-wetting agent for the metal.

In contrast, Sykes teaches that “gases are directed at the molten metal at an angle of incidence of at least about 45°.” Col. 2, lines 5–10; col. 3, lines 50–65. Sykes teaches that it is the angle of the torch that is selected. This is the angle at which the gas is directed at the molten metal and is selected by the user. This angle can be selected regardless of the specific molten metal or particular surface.

Sykes fails to teach that one would select or use a fluid based on its non-wetting properties with respect to the specific molten metal. Sykes fails to recite the concept of non-wetting agent.

"To anticipate a claim, a reference must disclose every element of the challenged claim and enable one skilled in the art to make the anticipating subject matter." *PPG Indus., Inc. v. Guardian Indus. Corp.*, 75 F.3d 1558, 1566 (Fed. Cir. 1996). "The factual determination of anticipation requires the disclosure in a single reference of every element of the claimed invention." *Ex parte Levy*, 17 USPQ2d 1461, 1462 (Bd. Pat. App. & Int. 1990); *see also In re*

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Spada, 911 F.2d 705, 708 (Fed. Cir. 1990) ("Rejection for anticipation or lack of novelty requires, as the first step in the inquiry, that all the elements of the claimed invention be described in a single reference."); *Lindemann Maschinenfabrik GmbH v. American Hoist & Derrick*, 730 F.2d 1452, 1458 (Fed. Cir. 1984) ("Anticipation requires the presence in a single prior art reference disclosure of each and every element of the claimed invention, arranged as in the claim."). "Moreover, it is incumbent upon the examiner to identify wherein each and every facet of the claimed invention is disclosed in the applied reference." *Levy* at 1462.

Where there are differences between the referenced disclosure and the claim, a rejection under § 102 is improper. *Titanium Metals Corp. of America v. Banner*, 778 F.2d 775, 780 (Fed. Cir. 1985). "There must be no difference between the claimed invention and the referenced disclosure, as viewed by a person of ordinary skill in the field of the invention." *Scripps Clinic and Research Foundation v. Genentech, Inc.*, 927 F.2d 1565, 1576 (Fed. Cir. 1991).

Sykes does not disclose the element present in the claims of the present application that the fluid be a non-wetting agent for the metal or carries a non-wetting agent for the metal. There are differences between the disclosure in Sykes and the claims of the present application. Thus, Applicants respectfully submit that rejection of the claims of the present application under 35 U.S.C. § 102 in view of Sykes is improper, and respectfully request withdrawal of the rejections under Section 102.

There is no Reason Provided for Rejection of Claims 26, 28, and 29

The Office Action does not provide a reason for the rejection of claims 26, 28, and 29. Each of these claims are dependent from independent claim 25, but it is not clear if these dependent claims would be allowable if rewritten to include all of the limitations of the base claim and any intervening claim, or if these dependent claims are rejected under the sole reference cited for rejection of the other claims of the application. Clarification of the status of the allowability of claims 26, 28, and 29 is respectfully requested.

Conclusion

Claims 1–30 are pending in the application. In view of the above remarks and amendments, it is submitted that claims 1–30 are in condition for allowance. Prompt notice of allowance of all pending claims is respectfully requested.

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Respectfully submitted,

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